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LE, LANA N	
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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/771,762	Applicant(s) BUER, KENNETH V.	
	Examiner Lana N Le	Art Unit 2685	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 August 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 13 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 13 is now amended to depend on itself. Appropriate correction is required.

Response to Arguments

3. Applicant's arguments do not comply with 37 CFR 1.111(c) because they do not clearly point out the patentable novelty which he or she thinks the claims present in view of the state of the art disclosed by the references cited or the objections made. Further, they do not show how the amendments avoid such references or objections.

Applicant points out that the diplexer of the invention "diplexer 300 may be any configuration useful for combining at least two input signals and producing an output signal representing the sum of the input signals". However, this statement has the same meaning as the well known definition explained in applicant's specification that "one of ordinary skill in the art" will recognize that the diplexer can be a lumped element

combiner, etc. used for combining at least two input signals and producing an output signal (page 9, lines 14-20). Therefore, the lumped sum combiner (24 of figures 1-2) of Dougherty discloses applicant's diplexer (col 3, lines 11-17). Therefore, the distinction of the two meanings of the diplexer are not pointed out or shown.

4. In response to applicant's argument that the combination of the references do not disclose or suggest the claim limitations, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). In this case, the modified low noise block converter of Dougherty et al, the admitted prior art, and Rizzi combined disclose and suggest the claimed limitations for the reason as set forth in the motivation statement in the claims, i.e. the main reference suggests that the mixer is operable at microwave frequencies and therefore is applicable within a low noise block downconverter of the admitted prior art, and merely replacing a different type of mixer for the mixer of Dougherty et al does not render the obviousness as hindsight but is notoriously well known to one of ordinary skill in the art.

5. Applicant's arguments with respect to the added limitations in claims 1 and 11 and new claim 24 have been considered but are moot in view of the new ground(s) of rejection.

6. The dependent claims are not separately argued based on their further limitations and therefore depends on the alleged reasoning of patentability from the independent claims 1, 11 and 24.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 1-5 and 11-15 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Dougherty et al (US 5,465,420) in view of the admitted prior art and further in view of Rizzi (Microwave Engineering Passive Circuits, copyright 1988).

Regarding claim 1, Dougherty et al disclose a mixer 10 (figs 1-2), the mixer capable of operating at microwave frequencies (col 1, lines 24-25) the mixer 10 comprising:

a) an RF source 14 (fig. 1) for providing an RF signal over transmission line 18 (col 3, lines 1-11; col 1, lines 20-25);

b) a local frequency oscillator 12 (LO source; fig. 1) for providing a local oscillator signal via transmission line 16 (col 3, lines 11-17);

c) a high frequency diplexer (a lumped element combiner 24 of figs. 1-2; col 4, lines 57-60 since in the specification on page 9, lines 14-20 applicant states that one of ordinary skill in the art will recognize that a diplexer maybe any configuration comprised of a lumped element combiner, etc. used for combining at least two input signals and producing an output signal (page 9, lines 14-20) in order to utilize any alternative arrangement of circuit arts/components/elements that results in an output signal representing a sum/addition of the input signals as in applicant's claimed invention in which a device operates merely by combining or summing two input signals) for providing a diplexer output signal,

wherein the diplexer (lumped element combiner 24) further comprises:

at least a first diplexer input (combiner input port 22) for receiving an RF signal (over transmission line 18; col 3, lines 11-17), a second diplexer input (combiner input port 20) for receiving the local oscillator signal (over transmission line 16; col 3, lines 11-17), and a diplexer output (combiner output port 26) for providing a combiner output signal substantially equal to the sum of the RF signal and the local oscillator signal (to be outputted to transmission line 30; figs. 1 & 2; col 3, lines 16-18; col 3, lines 44-45).

d) a downconverter (32, 38) for receiving the diplexer output signal, wherein the downconverter provides an intermediate frequency output (col 3, lines 41-57).

Dougherty et al didn't disclose: a k-band radio frequency signal and a low noise block downconverter comprising a low noise amplifier, and the downconverter receives said

diplexer output signal at a first downconverter node and a second downconverter node and provides an intermediate frequency output equal to the half-rectification of said diplexer signal received at said first diplexer node and said second diplexer signal received at said second diplexer node.

The admitted prior art further discloses:

a low noise block downconverter for use in a satellite broadcasting system receiver (page 2, lines 11-18; fig. 1), the low noise block downconverter comprising a first low noise amplifier 130 (fig. 1) for providing an amplified radio frequency signal (page 5, lines 13-14), and

the downconverter (IC 210; fig. 2) receives said diplexer output signal at a first downconverter node (212) and a second downconverter node (214) and provides an intermediate frequency output (240A) equal to the half-rectification of said diplexer signal received at said first diplexer node and said second diplexer signal received at said second diplexer node (page 7, lines 4-19). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to put the mixer of Dougherty et al in a low noise block downconverter environment of the admitted prior art in order to downconvert higher frequency modulated carrier signals as suggested by the admitted prior art (see page 2, lines 11-12), i.e. for purposes of terrestrial reception of television signals having video information frequency modulated on a microwave band carrier emitted from a satellite, due to the mixer of Dougherty et al being particularly useful at microwave frequencies and therefore being capable of operating when it is used in a low noise block downconverter and to add the low noise amplifier of the low

noise block downconverter of the admitted prior art before Dougherty et al's mixer in order to strengthen the incoming signal from the low noise amplifier which is electronically connected the diplexer of the modified low noise block converter of Dougherty et al and the admitted prior art and provide it with less noise and to provide gain and input and output impedance as is common in the art before inputting the RF signal to the mixer, and

to substitute the downconverter (IC) or mixer of the admitted prior art for the mixer of Dougherty et al in order for the diplexer output signal of Dougherty et al to automatically split so as to direct two input signals into the downconverter IC 210 input nodes of the admitted prior art to do the function of half-rectify the two input signals into the downconverter in order to provide the intended use function of how the matched diodes pair operate to downconvert the input signal into a half-rectify output signal as suggested by the admitted prior art (page 7, lines 7-9).

Dougherty et al and the admitted prior art didn't specifically disclose:

a k-band radio frequency signal. Rizzi discloses wherein a k-band (18-26 GHz) is contained within the microwave frequency band (1-40GHz) in the typical microwave frequency range (300 MHz –1000GHz). Since Dougherty et al disclose the mixer is useful at microwave frequencies (col 1, lines 24-25), it would have been obvious to one of ordinary skill in the art at the time the invention was made to have a k-band RF signal in Dougherty et al and the admitted prior art in order to operate the mixer at a desired frequency of interest so that downconverting of a specific k-band signal will allow a

tuner within a satellite receiver to demodulate the corresponding audio and video signals.

Regarding claim 2, Dougherty et al, the admitted prior art, and Rizzi disclose a low noise block down-converter according to claim 1 wherein in the specification, page 9, lines 14-20, applicant states that one of ordinary skill in the art will recognize the diplexer may be comprised of a resistive combiner, or a distributed or other broad-band RF summing junction (page 9, lines 14-20 wherein the summing junction can be distributed or have other characteristic which can be resistive or wherein the resistive combiner is analogous to a resistive summing junction since a combiner also adds input signals and outputs a sum of the input signals). It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the lumped sum combiner of Dougherty et al with a resistive summing junction in order to use any type of equivalent summing circuit which is capable of adding the input signals for impedance matching purposes and isolation between the input signals.

Regarding claim 3, Dougherty et al, the admitted prior art, and Rizzi disclose a low noise block downconverter according to claim 1, wherein in the specification, page 9, lines 14-20, applicant states that one of ordinary skill in the art will recognize the high frequency diplexer further comprises a distributed element frequency selective junction (page 9, lines 14-20; a distributed element junction with frequency selectivity). It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the lumped sum combiner of Dougherty et al with a distributed element frequency selective junction in order to sum N independent and distributed circuit

elements at a particular frequency of interest to reduce noise occurring in electronic circuitry.

Regarding claim 4, Dougherty et al, the admitted prior art and Rizzi disclose a low noise block downconverter according to claim 1, wherein Dougherty et al disclose the diplexer comprises a lumped element junction (lumped element combiner 24; wherein by the dictionary definition a junction is a point of joining, wherein in the specification, page 9, lines 14-20, applicant states that one of ordinary skill in the art will recognize the lumped element junction/combiner can be frequency selective (page 9, lines 16-20). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the lumped element junction/combiner be frequency selective in order to add only the desired frequencies.

Regarding claim 5, Dougherty et al, the admitted prior art and Rizzi disclose a low noise block downconverter according to claim 1 wherein the admitted prior art disclose the downconverter further comprises an integrated circuit chip 210 (fig. 2). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the downconverter comprises an integrated circuit chip in order to have a compact and smaller sized overall receiver component device.

Regarding claim 11, Dougherty et al discloses a mixer 10 (the mixer type 10 being particularly useful or capable of operating at microwave frequencies; figs. 1& 2 and hereafter; col 1, lines 24-25; col 2, lines 62-64; col 4, lines 52-53) comprising:

a) a high frequency diplexer (a lumped element combiner 24; col 4, lines 59-60 wherein applicant states on page 9, lines 14-20 that one of ordinary skill in the art will

recognize that a diplexer maybe any configuration comprised of a lumped element combiner, etc. used for combining at least two input signals and producing an output signal (page 9, lines 14-20) in order to utilize any alternative arrangement of circuit arts/components/ elements that results in an output signal representing a sum/addition of the input signals as in applicant's claimed invention in which a device operates merely by combining or summing two input signals) for providing a diplexer output signal (combiner output signal at output port 26 to be outputted to transmission line 30; figs. 1-2; col 3, lines 16-21, lines 44-45),

the high frequency diplexer (lumped element combiner 24) further comprises at least a first diplexer input (combiner input port 22) for receiving an RF signal (over transmission line 18; col 3, lines 11-17), a second diplexer input (combiner input port 20) for receiving the local oscillator signal from LO source 12 (over transmission line 16; col 3, lines 11-17);

b) a local frequency oscillator 12 for providing the local oscillator signal over transmission line 16 to the second diplexer input port at 20 (fig. 1, col 3, lines 1-2; col 3, lines 11-17); and

c) a downconverter 32, 38 configured to downconvert the diplexer output signal (combiner output signal at output port 26) to provide an intermediate frequency output (col 3, lines 29-57).

Dougherty et al didn't disclose: the mixer receives a k-band RF signal, the mixer for use in a low noise block downconverter; and the intermediate frequency output is equal to a half-rectification of the k-band RF signal and the local oscillator signal.

The admitted prior art disclose a low noise block downconverter (page 2, lines 11-18; fig. 1); and an intermediate frequency output (240A) is equal to a half-rectification of an RF (RF) signal and a local oscillator (LO) signal (page 7, lines 4-9). It would have been obvious to one of ordinary skill in the art at the time the invention was made to put the mixer of Dougherty et al in a low noise block downconverter environment for the intended use of downconverting higher frequency modulated carrier signals as suggested by the admitted prior art (see page 2, lines 11-12) for the purpose of, i.e. terrestrial reception of television signals having video information frequency modulated on a microwave band carrier emitted from a satellite, due to the mixer of Dougherty et al being particularly useful at microwave frequencies and therefore being capable of operating when it is used in a low noise block downconverter, and to have the downconverter or mixer of the admitted prior art half-rectify the two input signals into the IC in order to provide the intended use function of how the matched diodes pair operate to downconvert the input signal into a half-rectify output signal as suggested by the admitted prior art (page 7, lines 7-9).

Dougherty et al and the admitted prior art didn't specifically disclose:

the mixer operates in k-band wherein the diplexer receives a k-band RF signal. Rizzi discloses wherein k-band (18-26 GHz) is contained within the commonly used microwave frequency bands (1-40Ghz) in the typical microwave frequency range (300 MHz –1000GHz). Since Dougherty et al disclose the mixer type 10 is not limited for use at any frequency range and particularly useful and operable at microwave frequencies (col 1, lines 24-25), it would have been obvious to one of ordinary skill in the art at the

time the invention was made to allow the mixer of Dougherty et al to operate in the k-band wherein the combiner/diplexer receives a k-band RF signal in order to operate the mixer at the frequency of interest, so that downconverting of a specific k-band signal will allow a tuner within a satellite receiver to demodulate the corresponding broadcast audio and video signals.

Regarding claim 12, Dougherty et al, the admitted prior art, and Rizzi disclose a k-band mixer according to claim 11 wherein in the specification, page 9, lines 14-20, applicant states that one of ordinary skill in the art will recognize the high frequency combiner comprises a resistive summer (resistive combiner; page 9, lines 14 wherein a summer and combiner are analogous since the combiner of Dougherty et al combines input signals and outputs a sum of the input signals). It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the lumped sum combiner of Dougherty et al with a resistive summer in order to use any type of equivalent summing circuit capable of adding the input signals for impedance matching purposes and isolation between the input signals.

Regarding claim 13, Dougherty et al, the admitted prior art and Rizzi disclose a k-band mixer according to claim 14 wherein Dougherty et al disclose the diplexer comprises a lumped element junction (lumped element combiner 24; wherein by the dictionary definition a junction is a point of joining) wherein in the specification, page 9, lines 14-20, applicant states that one of ordinary skill in the art will recognize the lumped element junction/combiner can be frequency selective (page 9, lines 16-20). It would have been obvious to one of ordinary skill in the art at the time the invention was made

to have the lumped element junction/combiner be frequency selective in order to combine only the desired frequencies.

Regarding claim 14, Dougherty et al, the admitted prior art and Rizzi disclose a k-band mixer according to claim 13 wherein in the specification, page 9, lines 14-20, applicant states that one of ordinary skill in the art will recognize the high frequency diplexer may comprises a distributed element frequency selective junction (a distributed element junction with frequency selectivity; page 9, lines 14-20). It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the lumped sum combiner of Dougherty et al with a distributed element frequency selective junction in order to sum N independent and distributed circuit elements at the frequency of interest to reduce noise occurring in electronic circuitry.

Regarding claim 15, Dougherty et al, the admitted prior art and Rizzi disclose a low noise block downconverter according to claim 11 wherein the admitted prior art disclose the downconverter comprises an integrated circuit chip 210, the integrated circuit chip having at least a first chip input 212, a second chip input 214 and a chip output at 260 (fig. 2; page 8, lines 8-9). It would have been obvious to one of ordinary skill in the art at the time the invention was made to integrate the downconverter into a chip circuitry in order to have a smaller size overall component device with lower current drain.

Regarding claim 24, Dougherty et al disclose a mixer 10 (figs. 1-2) comprising:

a local frequency oscillator (LO source 12; fig. 1) for providing a local oscillator signal via transmission line 16 (col 3, lines 11-17);

a high frequency diplexer (a lumped element combiner 24; col 4, lines 59-60 wherein applicant states on page 9, lines 14-20 that one of ordinary skill in the art will recognize that a diplexer maybe any configuration comprised of a lumped element combiner, etc. used for combining at least two input signals and producing an output signal, see page 9, lines 14-20, in order to utilize any alternative arrangement of circuit arts/components/ elements that results in an output signal representing a sum/addition of the input signals as in applicant's claimed invention in which a device operates merely by combining or summing two input signals) for providing a diplexer output signal (combiner output signal at output port 26; col 3, lines 16-21),

wherein the diplexer (lumped element combiner 24) further comprises: at least a first diplexer input (combiner input port 22) for receiving an RF signal (over transmission line 18; col 3, lines 11-17), a second diplexer input (combiner input port 20) for receiving the local oscillator signal (over transmission line 16; col 3, lines 11-17), and a diplexer output (combiner output port 26) for providing a combiner output signal substantially equal to the sum of the RF signal and the local oscillator signal (to be outputted to transmission line 30; figs. 1 & 2; col 3, lines 16-18; col 3, lines 44-45).

Dougherty et al do not disclose: a low noise block downconverter for use in a satellite broadcasting system receiver; a first low noise amplifier for providing an amplified k-band RF signal; and

an integrated circuit (IC) for receiving said diplexer output signal and providing an intermediate frequency output signal, said IC comprising a first IC input and a second IC input for receiving said diplexer output signal, said IC configured to half-rectify the

diplexer output received at said first IC input and said second IC input.

The admitted prior art discloses:

a low noise block downconverter for use in a satellite broadcasting system receiver (page 2, lines 11-18; fig. 1) comprising a first low noise amplifier 130 (fig. 1) for providing an amplified radio frequency signal (page 5, lines 13-14);

an integrated circuit (IC 210; fig. 2 and hereafter) for receiving said diplexer output signal (the sum of the input signals of Dougherty et al automatically split to direct signals into the downconverter IC 210 of the admitted prior art) and providing an intermediate frequency output signal (240A), the IC (IC 210) comprising a first IC input (212) and a second IC input (214) for receiving said diplexer output signal, said IC (IC 210) configured to half-rectify the diplexer output received at said first IC input (212) and said second IC input (214) (page 7, lines 4-19). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to put the mixer of Dougherty et al in a low noise block downconverter environment of the admitted prior art in order to downconvert higher frequency modulated carrier signals as suggested by the admitted prior art (see page 2, lines 11-12), i.e. for purposes of terrestrial reception of television signals having video information frequency modulated on a microwave band carrier emitted from a satellite, due to the mixer of Dougherty et al being particularly useful at microwave frequencies and therefore being capable of operating when it is used in a low noise block downconverter and to add the low noise amplifier of the low noise block downconverter of the admitted prior art to Dougherty et al in order to strengthen the incoming signal from the low noise amplifier which is electronically

connected the diplexer of the modified low noise block converter of Dougherty et al and the admitted prior art and provide it with less noise and to provide gain and input and output impedance as is common in the art before inputting the RF signal to the mixer, and

to substitute the downconverter (IC) or mixer of the admitted prior art for the mixer of Dougherty et al in order for the diplexer output signal of Dougherty et al to automatically split so as to direct two input signals into the downconverter IC 210 input nodes of the admitted prior art to do the function of half-rectify the two input signals into the downconverter in order to provide the intended use function of how the matched diodes pair operate to downconvert the input signal into a half-rectify output signal as suggested by the admitted prior art (page 7, lines 7-9).

Dougherty et al and the admitted prior art didn't specifically disclose:

a k-band radio frequency signal. Rizzi discloses wherein a k-band (18-26 GHz) is contained within the microwave frequency band (1-40GHz) in the typical microwave frequency range (300 MHz –1000GHz). Since Dougherty et al disclose the mixer is useful at microwave frequencies (col 1, lines 24-25), it would have been obvious to one of ordinary skill in the art at the time the invention was made to have a k-band RF signal in Dougherty et al and the admitted prior art in order to operate the mixer at a desired frequency of interest so that downconverting of a specific k-band signal will allow a tuner within a satellite receiver to demodulate the corresponding audio and video signals.

9. Claims 6-9, 16-20, and 22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dougherty et al (US 5,465,420) in view of the admitted prior art and Rizzi (Microwave Engineering Passive Circuits, copyright 1988) and further in view of Akaishi (JP 08-250936).

Regarding claim 6, Dougherty et al, the admitted prior art, and Rizzi disclose a low noise block downconverter according to claim 5 wherein the admitted prior art discloses the integrated circuit chip 210 further comprises at least a first diode 220 and a second diode 230 (fig. 2; matched diode pair 220 & 230).

Dougherty et al, the admitted prior art, and Rizzi fail to explicitly disclose:

wherein the first diode and the second diode form an anti-parallel diode pair, the anti-parallel diode pair being electrically connected to the diplexer. Akaishi discloses wherein the first diode and the second diode form an anti-parallel diode pair 23 (the anti-parallel diode pair downconverter receiving one single input which then splits into two parts to be inputted into the two matched diodes D1 and D2 configured as an anti-parallel diode pair as in the conventional anti-parallel diode downconverter of fig. 4 page 12, lines 14-15; paragraphs 2-4). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the anti-parallel diode pair of Akaishi for the downconverter within the modified low noise block downconverter of Dougherty et al, the admitted prior art, and Rizzi in order to utilize any alternative type of conventional downconverter, herein a matched diode pair configured as an anti-parallel diode pair that's capable of receiving one input from the diplexer, to downconvert to a lower frequency with the advantages of acquiring a lower noise figure

due to the even harmonic mixing and self-protection against large peak inverse voltage burnout.

Regarding claim 7, Dougherty et al, the admitted prior art, Rizzi, and Akaishi disclose a low noise block downconverter according to claim 6 wherein Akaishi further discloses the anti-parallel diode pair produces an intermediate frequency (fIF; para. 3).

Regarding claim 8, Dougherty et al, the admitted prior art, Rizzi, and Akaishi disclose a low noise block downconverter according to claim 7 wherein the admitted prior art disclose the local oscillator signal is between 9.75 GHz to 11.3 GHz (page 8, lines 20-22). It would have been obvious to one of ordinary skill in the art at the time the invention was made for Dougherty et al to have a local oscillator signal within this range in order to select a preferred local oscillator frequency range to meet the requirements for mixers used in the microwave frequency bands of Dougherty et al, i.e. the ku-band and the k-band.

Regarding claim 9, Dougherty et al, the admitted prior art, Rizzi, and Akaishi disclose a low noise block downconverter according to claim 8, wherein the admitted prior art disclose the intermediate frequency is from about 900 MHz to 2.15 GHz (page 7, lines 13-14; page 8, lines 22-24). It would have been obvious to one of ordinary skill in the art at the time the invention was made to downconvert to this IF range in order to allow the mixer of Dougherty et al to downconvert to a preferred intermediate frequency range of interest to make the receiver less susceptible to noise and allow the satellite receiver to properly tune to the proper frequency so that demodulation can take place

and electronically transmitted information can be read and extracted as suggested by the admitted prior art (page 2, lines 5-8).

Regarding claim 16, Dougherty et al, the admitted prior art, and Rizzi disclose a k-band mixer according to claim 15 wherein the admitted prior art discloses: the integrated circuit chip 210 further comprises at least a first diode 220 and a second diode 230 (fig. 2; matched diode pair 220 & 230).

Dougherty et al, the admitted prior art, and Rizzi fail to explicitly disclose:

wherein the first diode and the second diode form an anti-parallel diode pair, the anti-parallel diode pair being electrically connected to the diplexer. Akaishi discloses wherein the first diode and the second diode form an anti-parallel diode pair 23 (the anti-parallel diode pair downconverter receiving one single input which then splits into two parts to be inputted into the two matched diodes D1 and D2 as in the conventional anti-parallel diode downconverter; paragraphs 2-4; fig. 4; page 12, lines 14-15). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the anti-parallel diode pair of Akaishi for the downconverter within the modified k-band mixer of Dougherty et al, the admitted prior art and Rizzi in order to utilize any alternative type of conventional downconverter, herein a matched diode pair configured as an anti-parallel diode pair which is capable of receiving one input, to downconvert to a lower intermediate frequency with the advantages of acquiring a lower noise figure due to the even harmonic mixing and self-protection against large peak inverse voltage burnout.

Regarding claim 17, Dougherty et al, the admitted prior art, Rizzi, and Akaishi disclose a k-band frequency mixer according to claim 16 wherein Dougherty et al further disclose the high frequency diplexer (lumped element combiner 24) combines the high frequency RF signal (RF signal from RF source 14 over transmission line 18 of fig. 1; col 3, lines 1-17) and the local oscillator signal (LO signal from LO source 12, see fig. 1 col 3, lines 1-17) to produce a combined high frequency signal (RF+LO at output port 26), the combined high frequency signal being provided to FET and conditioning circuits 28, 32 (col 4, lines 25-32; col 1, lines 37-42). Dougherty et al didn't disclose: the combined high frequency signal being provided to the anti-parallel diode pair. Akaishi further discloses the combined high frequency signal being provided to the anti-parallel diode pair 23 (paragraphs 2-4). It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the anti-parallel diode pair of Akaishi for the downconverter of Dougherty et al, the admitted prior art, and Rizzi to receive the combined high frequency signal in order to utilize any alternative type of typical mixers, herein the conventional anti-parallel diode pair capable of receiving the combined high frequency signal input for the purpose of acquiring a lower noise figure due to the even harmonic mixing and self-protection against large peak inverse voltage burnout.

Regarding claim 18, Dougherty et al, the admitted prior art, Rizzi, and Akaishi disclose the k-band frequency mixer according to claim 17 wherein Akaishi further discloses the anti-parallel diode pair produces an intermediate frequency fIF at 22 (fig. 4; para. 3).

Regarding claim 19, Dougherty et al, the admitted prior art, Rizzi, and Akaishi disclose the k-band frequency mixer according to claim 18, wherein the admitted prior art further discloses the local oscillator signal is from about 9.75 GHz to about 11.3 GHz (page 8, lines 20-22). It would have been obvious to one of ordinary skill in the art at the time the invention was made for Dougherty et al to have a local oscillator signal within this range in order to select a preferred local oscillator frequency range to meet the requirements for mixers used in the microwave frequency bands of Dougherty et al, i.e. the ku-band and the k-band.

Regarding claim 20, Dougherty et al, the admitted prior art, Rizzi, and Akaishi disclose the k-band mixer according to claim 19, wherein the admitted prior art further disclose the mixer produces an intermediate frequency range is from about 950 MHz to about 2.15 GHz (page 8, lines 22-24 wherein the IF range of 950 MHz to 2.15 GHz is within the 950-2.5 GHz range). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have an intermediate frequency within this frequency range in order to downconvert and reduce the microwave frequency carrier signals to a specific desired frequency range low enough and with less susceptibility to noise for reception by a satellite receiver and tuner which can then tune to the proper frequency, and in order to have compatibility with the satellite receiver equipment so that demodulation can take place and electronically transmitted information can be read and extracted as suggested by the admitted prior art (page 2, lines 5-8).

Regarding claim 22, Dougherty et al disclose a method for downconverting a radio frequency, (col 2, line 62 – col 3, line 57), the method comprising:

combining via combiner 24 (figs. 1 & 2) a local oscillator frequency (over transmission line 16 from LO source 12; col 3, lines 1-17; figs. 1-2 and hereafter) and an RF frequency (from RF source 14 over transmission line 18 at input terminal 22; col 3, lines 1-17) to produce a high frequency signal (the combined signal to be outputted to transmission line 30 representing the sum of the LO and RF signals at output port 26; col 3, lines 44-45; col 3, lines 16-18).

inputting the high frequency signal into a downconverter (32, 38) to produce an intermediate frequency (col 3, lines 41-57).

However, Dougherty et al fail to further disclose:

a k-band radio frequency; the intermediate frequency range is from about 950 MHz to 2.15 GHz; the downconverter comprising an integrated circuit chip, the integrated circuit chip containing an anti-parallel diode pair.

The admitted prior art discloses:

a ku-band downconverter 210 produces an intermediate frequency range from about 950 MHz to 2.5 GHz (page 7, lines 11-19) wherein the claimed range of 950 MHz to 2.15 GHz is within the 950 MHz. to 2.5 GHz range of the admitted prior art, and the downconverter comprises an integrated circuit chip 210. It would have been obvious to one of ordinary skill in the art at the time the invention was made to downconvert to this specific intermediate frequency range in order to allow the mixer of Dougherty et al to downconvert to a preferred intermediate frequency range of interest to make the receiver less susceptible to noise and to have compatibility with the satellite receiver equipment so that it can properly tune to the proper frequency so that demodulation can

take place and the electronically transmitted information can be read and extracted as suggested by the admitted prior art (page 2, lines 5-8).

Dougherty et al and the admitted prior art didn't specifically disclose:

a k-band radio frequency. Rizzi discloses a k-band (18-26 GHz) is contained within the microwave frequency bands (1-40Ghz) in the typical microwave frequency range (300 MHz –1000GHz). Since Dougherty et al disclose the method of downconverting is capable of downconverting a signal at microwave frequencies due to the particular downconverter type (col 1, lines 24-25), it would have been obvious to one of ordinary skill in the art at the time the invention was made to have a k-band RF signal in order to have a process of downconverting a selected frequency of interest, i.e. a specific k-band signal which will allow a tuner within a satellite receiver to demodulate the corresponding broadcast audio and video signals.

Dougherty et al, the admitted prior art and Rizzi didn't disclose:

the integrated circuit chip further containing an anti-parallel diode pair.

Akaishi discloses a downconverter within a mixer circuit in the microwave band containing an anti-parallel diode pair 23 (paragraphs 2-4; fig. 4; page 12, lines 14-15). It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the anti-parallel diode pair of Akaishi for the downconverter of Dougherty et al, the admitted prior art and Rizzi in order to utilize any alternative kind of typical mixers, herein the anti-parallel diode pair which is capable of receiving one input from the result of the diplexer, to downconvert to a lower IF frequency from a high

frequency signal with the advantage of a lower noise figure due to the even harmonic mixing and its self-protection characteristic against large peak inverse voltage burnout.

Regarding claim 23, Dougherty et al, the admitted prior art, Rizzi and Akaishi disclose a method according to claim 22 wherein the admitted prior art disclose the method further comprises the step of amplifying the intermediate frequency to a predetermined frequency via IF amplifier 140 (fig. 1; page 5, lines 13-14). It would have been obvious to one of ordinary skill in the art at the time the invention was made to amplify the IF to a predetermined frequency in order to have a device that's capable of detecting the intensity of the received IF signal and so that it can strengthen it for further receiver processing.

10. Claims 10 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dougherty et al (US 5,465,420) in view of the admitted prior art, Rizzi (Microwave Engineering Passive Circuits, copyright 1988) and Akaishi (JP 08-250936) as applied to claims 9 and 20 above respectively, and further in view of Nash et al (US 6,317,590).

Regarding claim 10, Dougherty et al, the admitted prior art, Rizzi, and Akaishi disclose the low noise block downconverter according to claim 9, wherein Dougherty et al, the admitted prior art, Rizzi, and Akaishi didn't disclose the integrated circuit chip is further configured in a sub-harmonically pumped arrangement. Nash et al disclose the mixer is configured in a sub-harmonically pumped arrangement (col 5, lines 9-11). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have a sub-harmonically pumped arrangement in the integrated circuit

downconverter of Dougherty, the admitted prior art, Rizzi, and Akaishi in order to reduce conversion loss and to avoid generating harmonic in the receiver as suggested by Nash et al (col 2, lines 25-30).

Regarding claim 21, Dougherty et al, the admitted prior art, Rizzi, and Akaishi disclose the k-band mixer according to claim 20, wherein Dougherty et al, the admitted prior art, Rizzi, and Akaishi fail to further disclose the integrated circuit chip is configured in a sub-harmonically pumped arrangement. Nash discloses the mixer is configured in a sub-harmonically pumped arrangement (col 5, lines 9-11). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have a sub-harmonically pumped arrangement in the integrated circuit downconverter of Dougherty, the admitted prior art, Rizzi, and Akaishi in order to reduce conversion loss and to avoid generating harmonic in the receiver as suggested by Nash et al (col 2, lines 25-30).

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lana Le whose telephone number is (703) 308-5836. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Urban can be reached on (703) 305-4385. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4750.

Lana Le

Lana Le

June 28, 2005

REPLACEMENT SHEET

please enter.
L.L.
6-27-05

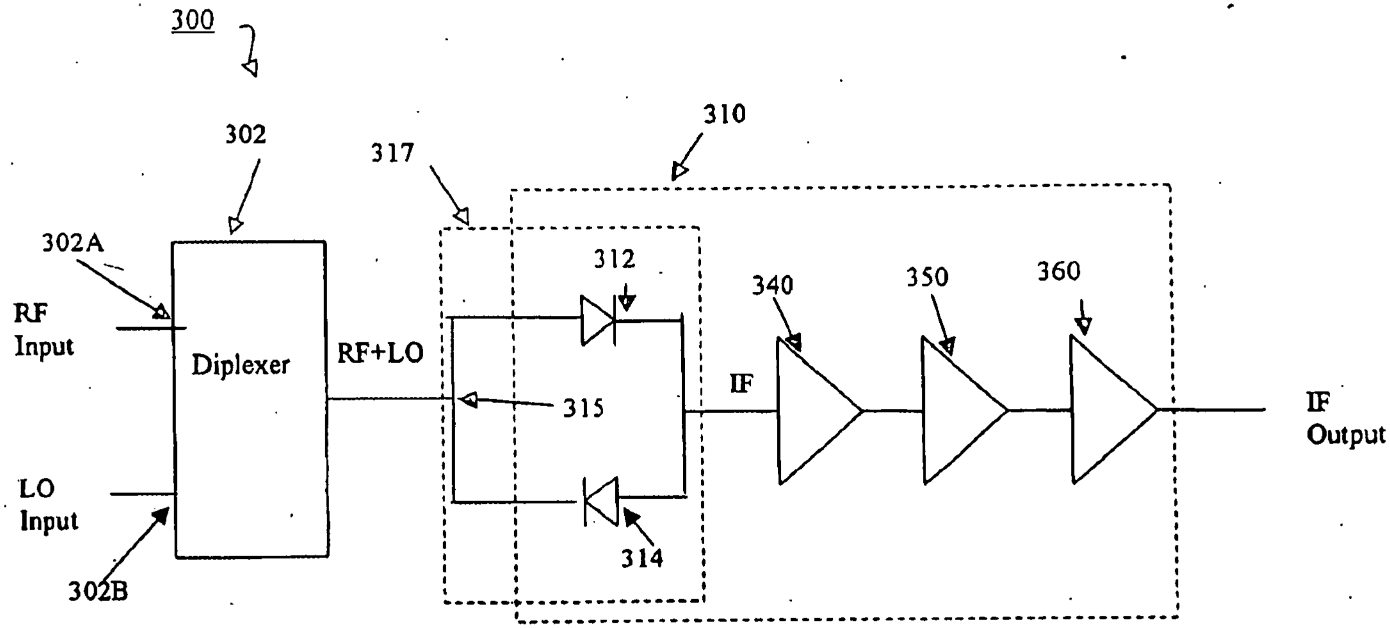

Figure 3.

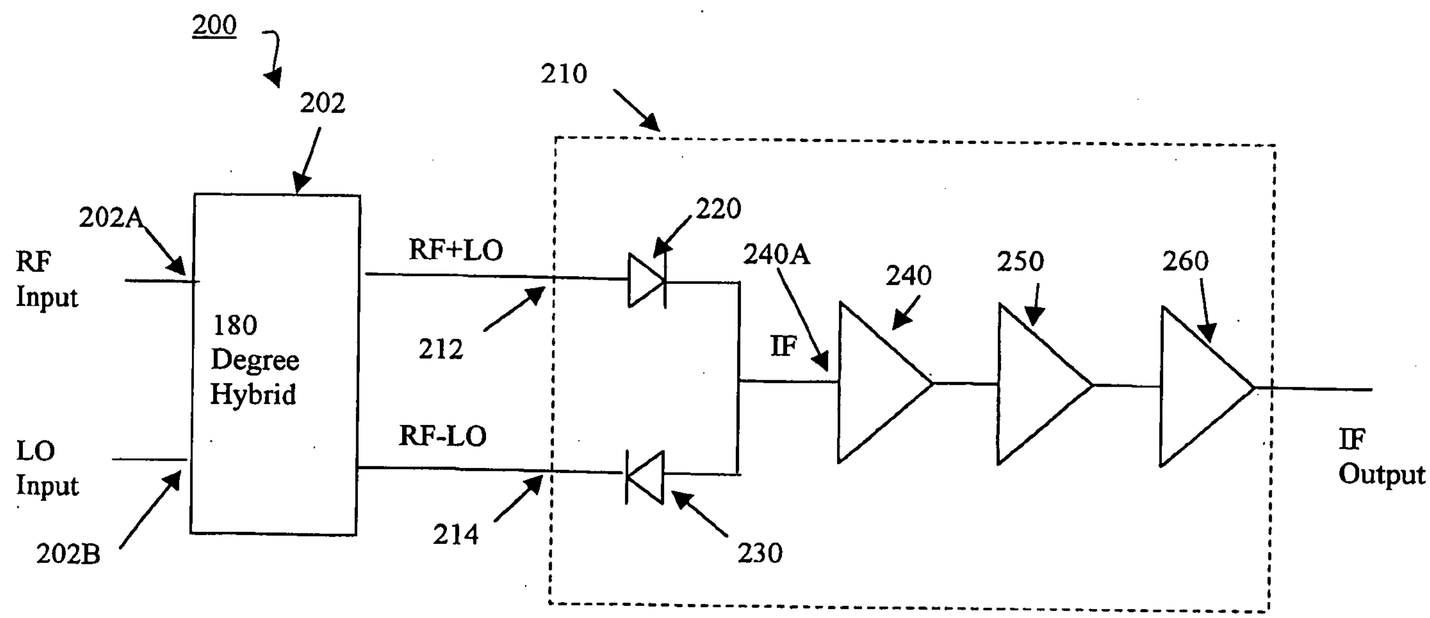

Figure 2. Conventional Ku-Band Mixer (Prior Art)

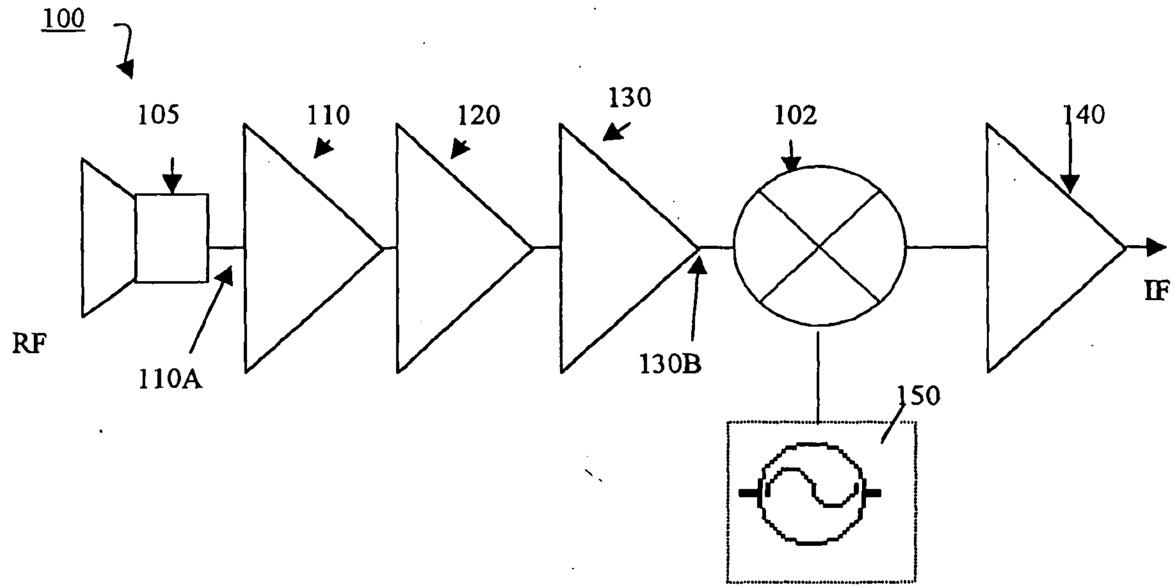

Figure 1. Low Noise Block Downconverter (Prior Art)